Infant Mortality

Definition: Death of a child under one year of age. These deaths are often divided into two groupings: *neonatal* mortality (death of an infant within the first 27 days of life) and *postneonatal* mortality (death of an infant of 28-364 days of age). Rates are the number of deaths in a given year per 1,000 live births.

Summary

Infant mortality is an important health indicator associated with a variety of factors such as maternal health, quality of and access to medical care, socio-economic conditions, and public health practice.[1] In 1994, in Washington state, 479 infants died in their first year of life. The infant mortality rate for that year was 6.2 per 1,000 live births, compared to the 1994 national rate of 7.9. Although Washington's infant mortality rate was lower than the national rate, major disparities still exist among racial and ethnic groups in the state.

Time Trends

Washington's infant mortality rate has steadily declined for the past decade, from 11.8 per 1000 live births in 1980 to 6.2 in 1994. This trend is consistent with the national pattern. Some studies suggest that the decrease is most attributable to improvements in the availability and accessibility of neonatal facilities and specialists who are trained to care for newborns with advanced medical needs.[2] Sudden Infant Death Syndrome (SIDS) deaths are a major cause of infant mortality. They declined from 185 in 1990 (30% of total infant deaths) to 115 in 1994 (24%).

Year 2000 Goal

Washington's Year 2000 goal is to reduce overall infant mortality to 6.5 deaths per 1,000 live births. The state target rates for neonatal and post-neonatal mortality (see definition, above) are 3.5 and 3.0, respectively. While Washington has already met its goal for overall infant mortality, the state targets will probably not be met for African Americans and Native Americans.

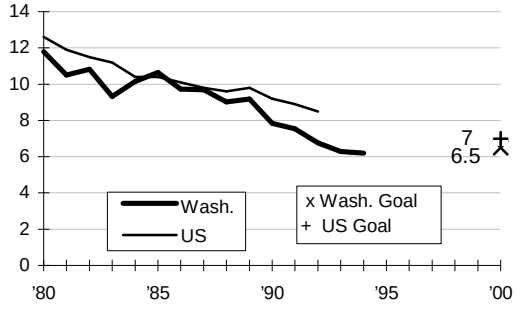
Geographic Variation

Combining 1991-1993 data, the Washington counties with the highest infant mortality rates were Ferry, Jefferson, Asotin, Klickitat, Stevens, Skamania, and Lewis. The lowest rates were in Wahkiakum, Garfield, Chelan, Pend Oreille, Adams, Whitman, and Snohomish Counties.

The 1991-1993 combined rate of infant deaths was highest in rural areas at 7.5/1000. The average rate for small urban areas was 7.0/1000 and for metropolitan areas, the average was 6.1. Rural areas may be impacted by specific population characteristics such as low income, as well as access and transportation problems related to obtaining appropriate health care services.

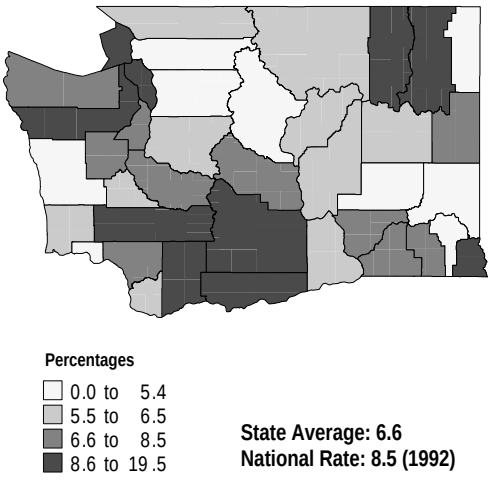
Infant Mortality Rates

Infant Deaths per 1000 Live Births, with Year 2000 Goals



Infant Mortality

Deaths Per 1,000 Live Births, 1992-1994

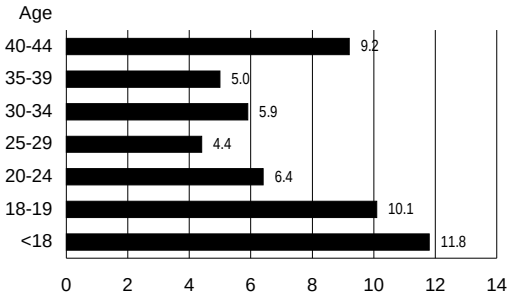


State Average: 6.6
National Rate: 8.5 (1992)

Age

In 1993, teen mothers, especially those under 18, experienced higher rates of infant mortality than older mothers. Women over 40 also had relatively high rates.

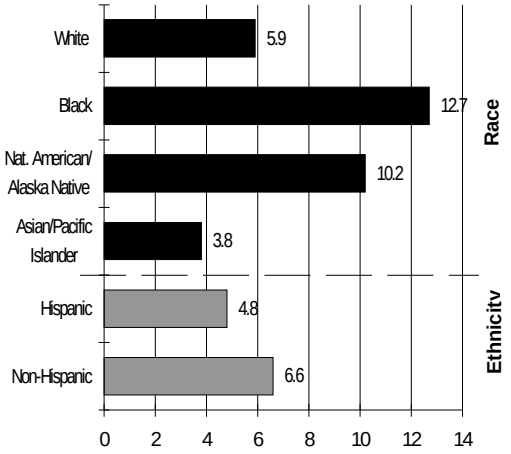
Infant Mortality
by Age of Mother
Infant Deaths per 1000 Live Births, Wash. 1993



Race and Ethnicity

There are major disparities among racial and ethnic groups in infant death rates. While the 1993 statewide rate is below the year 2000 goal of 6.5, rates for African Americans and Native Americans remain well above that. However, as the statewide infant mortality rate has declined, the gaps between the African American and Native American rates compared to the statewide rate have begun to slightly diminish. Infant mortality rates for African Americans declined from 16.6 in 1989 to 12.7 in 1993. Native American rates dropped from 19.6 in 1989 to 10.3 in 1993. African American infants tend to die during the neonatal period; Native American infants tend to die during the postneonatal period. Infant mortality rates are lower for babies born to Hispanic women (5.5) than non-Hispanic women (6.1). A woman claiming Hispanic ethnicity can be a member of any racial group.

Infant Mortality Rates
by Race and Ethnicity
Infant Deaths per 1000 Live Births, Wash. 1993



Infant mortality rates are lower for babies born to Hispanic women (4.8) than non-Hispanic women (6.6). A woman claiming Hispanic ethnicity can be a member of any racial group.

Income and Education

Low income is associated with higher infant mortality rates. Medicaid enrollment is used as a measure of low income. In 1993, the infant mortality rate for Medicaid-eligible infants was 7.3, compared to 5.1 for non-Medicaid infants. (See Technical Appendix for definition of Medicaid-eligible infants).

Levels of mothers' education are also associated with the incidence of infant mortality. In 1993, mothers with less than a high school education had a higher incidence of infant mortality (8.3), than high school graduates (5.7) and women with some college (4.9).

Other Measures of Impact and Burden

Timing and Causes of Death. The risks and causes of death vary, depending upon when the death occurs relative to birth (fetal, neonatal, or postneonatal) and health-specific conditions.

The three leading causes of infant death in Washington in 1994 were congenital anomalies (27%), certain causes associated with pregnancy or delivery (34%), and sudden infant death syndrome (24%). (See Technical Appendix for definitions) External causes such as homicide, motor vehicle

accidents, or choking/suffocation accounted for less than 4% of all infant deaths, but play a larger role among postneonatal deaths.

Neonatal mortality causes are related to the prenatal period and to birth risks. However, causes of post-neonatal mortality can be related to congenital anomalies or to events or conditions that arise after birth which suggest an environmental or behavioral impact.

Low Birth Weight. Low birth weight is a major contributor to infant mortality. Of the neonatal deaths reported for 1993, 65% were low birth weight infants (under 2500 grams). (See Low Birth Weight Section.)

Costs. Every child that dies in the first year of life is a significant loss for the individual family and community at large. No dollar figure can be placed on this loss, but there may be substantial medical and other costs related to illness and special needs up to the time of death.

Risk and Protective Factors

Maternal Medical Risks-Pregnancy Related. Women often have multiple risk factors, making it difficult to determine the specific contribution of such factors such as smoking, drinking, or lack of prenatal care. In 1993, mothers with at least one medical risk made up 31% of all births; but among infants who died, 51% of mothers had a medical risk. Medically defined risks are: maternal health conditions, such as diabetes, hypertension; multiple gestations; age in the teens or over 40. Appropriate medical management of maternal disease can prevent or minimize the impact on the fetus and newborn. Lack of medical care appropriate to health risk is also associated with infant mortality. (See Prenatal Care Section.)

Infant Medical Risks. In addition to low birth weight, infant medical risks include congenital anomalies, which are the leading cause of infant death in Washington. Inadequate genetic screening prior to and during early pregnancy can result in undetected anomalies at birth.

Behavioral and Environmental Risks. Babies born to mothers who smoke, drink, or use drugs are more likely to die (especially due to SIDS). In 1993, mothers who smoked made up 18% of all births, but made up 28% of all infant deaths. Infant mortality rates in Washington for children born to Medicaid-identified substance abusers (16.3) are substantially higher than rates for Medicaid non-substance abusers (9.0).[3] Risks for SIDS include low birth weight, infants who are put to sleep on their stomach, and mothers who smoked during pregnancy and following birth.

Pregnancies occurring too close together can impact a mother's medical condition and compromise the condition of the fetus, causing increased risk for fetal and neonatal death. Short pregnancy intervals also cause increased stress on the parents, which may lead to poor parenting and increased risk of situations of abuse, neglect, and injury.

Women whose pregnancies are unintended have higher rates of tobacco, alcohol and drug use and inadequate prenatal care and are less likely to receive reproductive health care. Infants who were unintended are at greater risk of being low birth weight, neglected and abused. These are all risk factors for infant mortality. (see Unintended Pregnancy Section).

Some studies suggest an association between absence of the father and increased infant mortality. Also, physical assault by the woman's partner either during pregnancy or directed at the infant can cause fetal or infant mortality. Lack of paternal support can influence a woman's ability to refrain from substance use and other harmful behaviors and to get care early.

Medical Protective Factors. Neural tube defects (NTDs) are serious, preventable birth defects including spina bifida (open spinal cord) and anencephaly (absence of the brain). The latter leads to death. Both the CDC and US Public Health Service recommend that all women of childbearing age consume 0.4 mg of folic acid daily to reduce the chances of a first occurrence of NTD.[4] Women who have had a prior NTD pregnancy should consume 4.0 mg of folic acid at least 1 month prior to conception through the first trimester.[5]

Behavioral and Environmental Protective Factors. An unpublished review of Hawaii's Healthy Start Program, which screens families at birth and then offers home visiting services, suggests that home visiting programs that identify families at risk and deliver services can reduce the incidence of child abuse.[6]

High Risk Groups

In general, infant mortality rates are highest for mothers in the following groups: teens under 18, African Americans, Native Americans, single mothers, those with low income, those with less than high school education, smokers, drinkers, and substance users.

Contributing factors that may be associated with a high risk group include unintended pregnancy, inadequate reproductive health and prenatal care, and limited social and parenting support systems.

Intervention Points, Strategies and Effectiveness

Because of the complex, multiple factors involved, no single intervention will be effective. Also, not all promising interventions have been evaluated.

Maternal Interventions. Good maternal health influences both birth outcome and child health. Strategies that have been shown to be effective in improving maternal health and in preventing low birth weight are discussed under the Low Birth Weight and Nutrition Sections. Research clearly indicates that the use of folic acid supplementation prevents neural tube defects.

Strategies that prevent preterm delivery may have the biggest impact on lowering the risk of African American infant mortality.[7]

Women who participate in WIC programs have lower rates of low and very low birth weights than eligible non-participants.(See also Nutrition Section) One national study of WIC specifically noted a decrease in fetal mortality and evidence of improved fetal growth.[8] Similar improvements are also attributed to early and continuous prenatal care that is appropriate to health risk.[9] Other studies suggest that reproductive health care prior to conception increases opportunities to prevent unintended pregnancies and identify modifiable risk factors associated with infant deaths.[10]

Infant Medical Interventions. Advanced perinatal treatment services may have been a major contributor to the decline in neonatal mortality in the US over the past 20 years. Regionalization of perinatal care in Washington has reduced geographic access barriers associated with high risk pregnancies and low birth weight births through appropriate referral to specialized centers.[11] Studies suggest the need for ongoing surveillance of specialized perinatal and NICU services in response to the trend of expansion and less regionalization of these services. Components to monitor include access to specialized services, quality of care, and adequacy of provider training and education.[12]

The appropriate use of pulmonary surfactant in premature infants has been shown to reduce the likelihood of serious lung disease and mortality in premature infants.[13]

Behavioral/Environmental Interventions. Putting babies to sleep on their backs or sides has been shown to decrease the likelihood of SIDS.[14] Also, breastfed infants are less likely to die from SIDS.[15] Other studies suggest that home visitation programs that focus on family support activities enhance existing health care services and have been effective in improving family health status and function which may lead to improved parenting satisfaction and skills, thus decreasing the risk of abuse and neglect.[16]

Current literature on prenatal smoking cessation suggests multifaceted intervention programs designed specifically for pregnant women begun early in pregnancy are the most effective in reducing smoking rates among pregnant women. However, intervention programs have been limited and to date show modest success. (See Smoking Section.)

Family planning services reduce unintended pregnancy, which is associated with infant mortality. Preconception services, including identification of reproductive health risks and health enhancing behaviors provided at every health care encounter for women of childbearing age improve options for early intervention.[17]

System development/research. Infant death reviews at the state and local levels provide opportunities to study health problems, analyze benefits of services and develop policy recommendations aimed at the preventable causes of infant mortality.[18]

Statewide birth defects registries can provide accurate counts, assess trends, plan pediatric care, identify risk factors, and help reduce risks for birth defects and death. In Washington state, due to resource constraints, the registry is limited to a passive system.

Maintenance and expansion of infant tracking systems can effectively identify high risk infants and provide health education and resource coordination. (See Immunization Section).

Use of infant car seats decreases injury and mortality due to car accidents.

Data Sources

State birth and infant death data (1980-1994) Washington Department of Health, Center for Health Statistics, Prepared by the DOH Maternal-and Child Health Program.

National infant mortality data: Health United States 1994, US Department of Health and Human Services.

For More Information

Washington Department of Health, Division of Community-Family Health, Maternal-and Child Health Programs, (360) 753-5870.

Technical Notes

See Technical Appendix for definitions of geographic areas, race/ethnicity, congenital anomalies, causes of early infant death and infant mortality rates.

Endnotes:

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[5] Ibid.

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[16] Home Visiting: Analysis and Recommendations, Giomby, Deanna, et al. The Future of Children Home Visiting, Vol. 3, No. 3, Winter 1993.

[17] Toward Improving the Outcome of Pregnancy, March of Dimes, 1993.

[18] Infant Mortality: A Practical Approach to the Analysis of the Leading Causes of Death and Risk Factors, Pediatrics, Vol. 86, No. 2, August 1990. Catherine Dolfus, et al.